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ABSTRACT

This article presents a rationale for correlation of science with language instruction, whether English as a second language (ESL) or first language development. Science can provide a conceptual base for vocabulary and syntactic development. Numerous studies indicate that language ability can be significantly increased through participation in activity science programs. Units can be developed around students' previous experiences building upon their present knowledge and developing self-esteem. Focusing on behavioral objectives will help in planning science activities. Group work which will encourage student discussion and cooperation toward a goal should be planned. Suggested topics for units or learning centers include "Foods of Ancient America," "Mother's Medicines," and "Clay Like the Indians Used." (Author/EJS)

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TEACHING LANGUAGE THROUGH SCIENCE

by

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By correlating science with your language lessons, whether ESL or first language development, you can improve instruction, stimulate greater use of the target language, and provide a new focus of interest for your students.

By using science you will be providing a conceptual base for vocabulary and syntactic development. Terms relating to description, comparison, location, and part-whole relationships are common to both language development and basic science instruction. In many ways science can provide a subject for discussion and give practice in talking and writing. Science-language correlation is a technique not related to a particular age group or language ability level.

Botany, zoology, ecology, chemistry or geology lend numerous topics of interest to students. Perhaps the best guide to topics would be the background of the instructor. You will encourage more

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discussion and feel more at ease with a familiar topic.

Science is often shortchanged, partly because teachers feel that language development must come first. Yet numerous studies indicate that language ability can be significantly increased through participation in activity science programs.

These studies also indicate that the science program used is less important than the technique. That is, students need to work with materials or aparatus themselves after having been directed toward a specific task. Tasks aim at developing the basic science process skills such as observation, classification, measuring, communicating gained information, and making inferences.

If your teaching situation already includes science, incorporate language development and reinforcement into the lessons. If it is an activity based program such as the Elementary Science Study (ESS), student activity, process skills, and discussion are an integral part of the program. If your school uses the traditional textbook approach, relate small group and individual activities to the units.

Frequently there is concern about student questions. Students need to be aware that in science we are dealing with a world of information. No individual could begin to have all the answers. Often handing out answers is not even advisable. At this stage close observation, comparison, and the study of relationships are more important than instant identification. A Science Curriculum Improve-

ment Study (SCIS) technique is to ask students to name organisms themselves based on prominant characteristics. Such a technique often inspires closer observation and memory of the experience than being given the actual name. As the study progresses, the instructor will guide the student toward appropriate reference material.

Some of the most fascinating units are those developed around students' previous experiences. Many ESL students have had rich experiences exploring with brothers and sisters, working with parents, or listening to the lore of older family members. Relate these experiences to the child's formal instruction and you release a fountain of discussion. That the school recognizes the value of this family related knowledge is important to the student's self esteem.

Students will have a greater chance for target language practice if groups are made up of students with differing language abilities including one or two students who are not English dominant, one or two who are, and one or two who are closer to being bilingual. Encourage target language use and interaction of all group members. A good deal of peer teaching and modeling can occur.

An important role of the instructor is as facilitator and recorder. Take notes of target vocabulary and phrases which come up as the group works. A tape recorder is sometimes helpful to catch language interaction. Later, these key words and phrases can be included on students vocabulary cards or lists and on experience charts

or they can be projected on the overhead for reinforcement and review.

Many students will be interested in related reading. There is a growing number of easy to read materials in English on many science topics. In Spanish much has become available in the past two years. But finding reading materials in these and other languages is still a problem. Some suggestions are included in the bibliography.

Focusing on behavioral objectives will help you plan science activities. Choose one or two science and language objectives. Set up your activity so that you can circulate from one group to another and watch each student at work. Some sample objectives and evaluation activities may serve as a guide.

Objectives The student will be able to:

- observe an object focusing on its size, shape, color, texture, smell, movement, and relationship to things around it
- classify materials by their properties. Distinguish differences and identify likenesses
- interpret the logic of a classification system he or she devises; tell why certain things go together
- compare objects on the basis of length, area, volume, weight, temperature
- record data from investigations in pictures, diaries, lab notes, stories, or diagrams
- construct and use graphs to display information
- report the stages of a procedure or investigation.

Evaluation Activities

- Observe and describe the cone of a pine tree naming at least

three characteristics orally or in writing.

- Distinguish between a pine cone and a magnolia seed pod. Tell three ways they differ.
- Classify plant seed pods in a set by placing them in three different baskets. Explain your basis of classification.
- Measure several types of chiles. Record their appearance in a colored picture. Graph their comparative sizes.
- Report the stages of collecting, screening, working and firing natural clay.

Some Ideas For Units or Learning Centers

1. Foods of Ancient America

You might begin this unit with an illustrated discussion of agriculture in ancient Mexico. Before the birth of Christ people were raising corn, squash, gourds, beans, and chiles in the Valley of Mexico. What kind of trial and error experiences would lead a former wandering group of hunters to develop corn as we know it from wild grass with heads less than an inch long? We can only guess what those generations of early agronomists thought as they noted changes in the corn or the small wild bean pods they found and began to plant and change.

tuna	jicama	chayote	aguacate
calabasa	frijoles	maíz	sauco
vainilla	papas	chile	nispolo
jitomate	camote	chocolate	cacahuate

Students examine the above fruits and vegetables. They may discuss how each one is used and draw the type of plant on which each

grows. Which are seeds? Which have seeds inside? Which grow on vines? Which grow underground? How have their ancient names influenced English? What books contain information about these plants?

Group members might cut each fleshy fruit in half and make a pencil drawing of one of the fruits whole and cut. Using a seed catalog they could find out how many varieties or corn, beans, or squash are available.

Students could prepare one of the foods above for their group to sample and write down their recipe. Describe the taste comparing it to other known foods. They could collect seeds from each food where available. Soak in warm water. Open some of the seeds. Examine the inside of the seed. Try sprouting some of the seeds.

II. Mother's Medicines

Discussion here could point out that in our grandparents'day (and even today in many cases) people used herbs to cure illnesses such as sore throat, stomach ache, sprains, bruises, and colic. You might ask why students think herbs like mint tea are still used today for stomach ache. How did ancient people decide what herb to use for an illness?

Students could interview parents or other family members and take home samples or herbs from the learning center. If parents can show how to prepare a medicine, ask them to do so and see what it tastes like. (Of course students should never taste an unknown plant without

the help of an adult who knows the plant.)

Additional activities could include reading how plants were used by early inhabitants and making accurate drawings of herbs so that no one could mistake it for something else.

Ask students to notice which herbs have square stems. Can they locate other plants in garden or field which have square stems? What else do they have in common? Are any herbs available in a seed catalog? For what are they used according to the catalog?

yerba buena	yerba santa	efidra	borraja
mansanilla	ruda	basilio	marrubio
sauco	romero	cilantro	oregano
cumino	perejil	chile	canela

Does anyone in the class know which of the plants above are used for medicine and which are used for seasoning food? Are some used for both? Which can be bought in a market? Students might try drying an herb for later use. Does it keep its perfume when dried?

Recently there has been a new interest in herbs. Try samples of commercial herb teas. Read the labels to see if any herbs students know are used in these teas. Are any herbs used in cosmetics and medicines?

III. Clay Like the Indians Used

Throughout Latin America and some parts of the present United States clay was used more than two thousand years ago to make cooking pots, water jugs and statues. Early Americans used clay which they

dug from the ground. Fire was used to harden the clay and make it waterproof.

Students might enjoy examining pictures and examples of prehispanic clay objects. For what were they used? How were the designs made? Using commercial clay, students could reproduce some of the clay objects. Why do some forms seem hard to reproduce?

Find an area where you may dig and locate some heavy clay soil. Soak the clay in water until soft. Pour off excess water after letting the clay settle. Work clay through a window screen to remove rocks which might explode in the kiln. Allow clay to dry enough to work. Prepare some clay figures. How is the clay you prepared and cleaned different from commercial clay?

These are only a few of the topics and activities you can use as a basis for language learning. There are many other ways your students can become involved with science process skills while learning English as a Second Language. Whatever you are into, whatever the interests and cultural strengths of your students, you can use science to teach language better and enrich their experience and your own.

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